THE MINERAL INDUSTRY OF NEW CALEDONIA

By Travis Q. Lyday

In 2003, the mineral industry of the French territory of New Caledonia continued to be dominated by the mining of nickeliferous laterite-saprolite-limonite-garnierite ores, production of ferronickel of various commercial grades, and nickel matte at the 62,000-metric-ton-per-year (t/yr)-capacity Doniambo Smelter in the harbor of Noumea, which is the territorial capital. The products of the Doniambo plant, which processed 3 million metric tons per year (Mt/yr) of nickel ore, consisted of 80% ferronickel and 20% nickel matte, which contained 75% nickel (Mining Journal Ltd., 2003). The ferronickel was used in making stainless steel. The nickel matte was shipped to Eramet SA's La Havre-Sandouville Refinery at Sandouville, which is located 15 kilometers (km) from La Havre in the north of France, for conversion into high-purity nickel metal and salts of nickel and cobalt from the intermediary nickel matte product produced at Doniambo (Eramet Group, 2003§;[1] Resource Information Unit, 2004, p. 161). The Doniambo Smelter was operated by Société le Nickel (SLN), a consortium of France's Eramet (60%); Société Territoriale Caledonian de Participation Industrielle (STCPI), which was a public company that represented the interests of the indigenous Kanak people of New Caledonia (30%); and Japan's Nisshin Steel Co. (10%) (Mining Journal Ltd., 2003; Resource Information Unit, 2004, p. 161). In a tie with Indonesia, New Caledonia ranked as the world's fourth leading source of nickel ore after Russia, Australia, and Canada; the two countries also produced equal amounts of nickel ore during the year (Kuck, 2004). New Caledonia was the leading producer of ferronickel in the world (Mining Journal Ltd., 2003).

The nickel industry, which included cobalt (a byproduct of nickel mining) and ferronickel and nickel matte production from smelting, was the mainstay of New Caledonia's economy. The industry accounted for about 10% of New Caledonia's gross domestic product and contributed an estimated 80% to foreign exchange earnings in 2003. New Caledonia has about one-quarter of the world's lateritic nickel resources, or about one-sixth of the global land-based nickel resources when sulfides are included (Australian Journal of Mining, 2001).

The dominance of the nickel industry in New Caledonia notwithstanding, the territory also has six large gold prospects, all of which were purchased by Base Metals Exploration NL of Australia from Quadtel Ltd. (formerly Caledonian Pacific Minerals NL) in November 2000. By yearend 2003, Base Metals Exploration was no longer active in mining and the sites were idle (Resource Information Unit, 2004, p. 59, 120).

On La Grand Terre, which is the main island of New Caledonia, SLN mined limonite-saprolite nickel ore from five opencut operations—Etoile du Nord (280 km northwest of Noumea), Kouaoua (140 km north-northwest of Noumea), Népoui-Kopéto (250 km northwest of Noumea), Thio (120 km north-northwest of Noumea), and Tiébaghi (320 km northwest of Noumea).

Etoile du Nord was mined by contractors of Société Minière Georges Nontagnat on behalf of SLN. In 2003, the mine produced about 18% of SLN's total ore production for the Doniambo Smelter. The limonite was exported to Australia.

Kouaoua Mine was mined by SLN. The saprolitic ore, which averaged 2% to 3% nickel, was conveyed to coastal stockpiles by a single 11-km-long conveyor for storage; eventually, the ore was loaded by rail-mounted bucket wheel onto carriers at the offshore terminal at the rate of 1,200 metric tons per hour. All ore shipped from Kouaoua was destined for the Doniambo Smelter.

Népoui-Kopéto Mine was reopened in 1994 after its closure in 1983. In 2003, the ore was mined from the summit of the Kopeto massif, which is located 20 km from the west coast and has an altitude of 850 to 1,000 meters (m). The ore body was saprolite with a waste-to-ore ratio of about 5:1. The 4 Mt/yr of material extracted was conveyed either to controlled spoil heaps, as was the case with the low nickel laterite overburden, or to the sorting plant, as was the case with the run-of-mine (ROM) ore. The lateritic ore was stored onsite. The ROM ore was screened, scrubbed, and sized onsite and then hydraulically transported via a 7-km-long pipe to the washing plant located at the foot of the Massif at an altitude of about 50 m. From the washing plant, the ore was trucked to the coast where it was stored, blended, and eventually shipped to the Doniambo Smelter. Mine output was about 830,000 t/yr of ore.

Mining began at Thio in 1880; by 1999, the mine produced about 900,000 metric tons (t) of nickel from 40 million metric tons (Mt) of saprolite. Although several sites at the Thio Mine were operated simultaneously in times past, only the Plateau and Camp des Sapins Mines were in operation in 2003. Ore from the Plateau Mine was trucked 13 km to stockpiles. Camp des Sapins Mine is located on the right bank of the River Thio at the center of the Kopeto range at an altitude of 800 m and almost 50 km by road from the coast. Ore from the Camp des Sapins Mine was taken into the Thio Valley by a 7.5-km-long cableway and trucked 20 km to coastal stockpiles; eventually, the ore was loaded onto 20,000 to 25,000 t ore carriers for shipment. Combined output from the Plateau and Camp des Sapins Mines was about 750,000 t/yr; a portion of this output was exported to Japan and the remainder went to the Doniambo Smelter.

Tiebaghi Mine, which was the newest SLN-owned mine, may prove to be the most difficult to mine. SLN had to use explosives to break up the lateritic iron crust because the ground was too hard for direct extraction using traditional techniques and machinery. Additionally, a 30-m-thick lateritic cover and the presence of subsurface water prompted SLN to examine the introduction of dragline mining techniques. The trial dragline used a 5-cubic-meter bucket, but if the technique were to be adopted, the production bucket would be four times larger.

Tiebaghi Mine opened directly onto the Port of Paagoumene. Ore from the mine was taken to a nearby storage area by 50-t trucks and eventually transported by barge to ore carriers moored 1 nautical mile offshore. In the future, a 1.3-km-long conveyor will move

[1]A reference that includes a section mark (§) is found in the Internet Reference Cited section.

the ore directly from the storage area to the ore carriers. The first ore deliveries from the Tiebaghi Mine to the Doniambo Smelter began in September 1998.

The Doniambo Smelter produced at a rate of 62,000 t/yr of nickel at the end of 2000; during that year, a feasibility study on bringing the production capacity to 75,000 t/yr by 2006 was initiated. The study was completed in early 2001 and in June, a $180 million expansion of the Doniambo Smelter was approved, with some of the funding to be used to develop the Tiebaghi Mine further. The Tiebaghi ore was to be mined using a new method developed by SLN; this method was based on systematic and accurate surveys of the deposit, computer modeling of the site, and an extraction method adapted to particularly damp ground. By October 2001, however, weakening demand for nickel had caused the smelter and the Tiebaghi mining expansion plans to be deferred.

By yearend 2003, alternative plans to extend the Tiebaghi Mine and increase its capacity from 250,000 t/yr to more than 1 Mt/yr by 2006 were in place (Resource Information Unit, 2004, p. 61).

The Bienvenue opencut mine is located 90 km north-northwest of Noumea and was owned by JCBerton Mines (JCBM), which was based in New Caledonia. Small-scale mining of high-grade saprolitic nickel ore (3.15% nickel) has been carried out intermittently there for more than 70 years. In 1990, JCBM began mining limonite ore for export to BHP Billiton Ltd.'s Yabulu nickel refinery in Townsville, Australia. The Bienvenue deposit's limonite ore reserves were estimated in 1997 to be about 6 Mt, which would be sufficient to maintain deliveries to the Yabulu refinery at the contracted rate of 450,000 wet t/yr until at least 2008. Société Minière du Sud Pacifique S.A. (SMSP) mined saprolitic nickel ore at the Boakaine and Kouaoua Mines to send to the Yabulu Refinery. The Boakaine Mine is located 150 km northwest of Noumea and the Kouaoua Mine is located 140 km north-northwest of Noumea (Resource Information Unit, 2004, p. 60-61).

In 1992, Canada's Inco Ltd., which was the Western world's leading nickel producer, acquired the rights to the Goro nickel deposit in South Province at the southern tip of La Grand Terre, which it had discovered in 1969. Based on the extensive laterite deposits that were amenable to opencut mining, the project had the potential to have one of the lowest-cost sources of nickel in the world. A fully integrated 12-metric-ton-per-day pilot plant was constructed from modules built in Canada and assembled onsite. For assistance in providing project funding, Inco began discussions with a number of companies interested in acquiring a minority interest in the project in 2001. The French research company Bureau de Recherches Géologiques et Minières (BRGM) obtained a 15% interest and Inco retained the remaining 85% interest.

In December 2002, Inco announced its decision to delay development of the $1.45 billion Goro project to conduct a complete project review because of higher-than-expected capital costs, which Inco announced were in the range of 30% to 45% (Resource Information Unit, 2004, p. 60).

In addition to producing abundant resources of nickel ore, the island territory also produced construction materials from several quarries, and Société des Ciments de Numbo operated a cement plant at Noumea.

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Major Source of Information

Le Service des Mines et l'Energie
BP 465, Nouméa, Cedex 98845, New Caledonia
Telephone: +687 27 39 44
Fax: +687 27 23 45
E-mail: mines@territoire.nc
Internet: http://www.gouv.nc/sme

TABLE 1

NEW CALEDONIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1999	2000	2001	2002	2003[p]
Cement		-- [e]	100,000 [e]	92,868	100,080 [r]	100,000
Cobalt, mine output:						
Co content[e]		11,000	12,300	5,900	6,000	6,000
Recovered		1,650	1,840	885	900	900
Nickel:						
Ore:						
Gross weight	thousand tons	6,561	7,087	6,971	5,890	7,000
Ni content		110,062	123,493	58,973	59,867 [r]	112,000
Metallurgical products:						
Ferronickel:						
Gross weight		158,000	157,000 [e]	162,000 [e]	170,000	162,000
Metal content (nickel plus cobalt)		45,289	43,914	45,912	48,650	45,900
Nickel matte:						
Gross weight		15,808	18,900 [e]	19,000 [e]	15,700	19,000
Metal content (nickel plus cobalt)		11,353	13,549	13,061	11,217	10,900

[e]Estimated; estimated data are rounded to no more than three significant digits. [p]Preliminary. [r]Revised. -- Zero.

[1]Table includes data available through October 1, 2004.

[2]In addition to the commodities listed, crude (unspecified) and crushed stone, construction sand, and silica sand for metallurgical use are produced, but data are insufficient to make reliable estimates of quantities.